

Additions to the cancellariid (Mollusca: Neogastropoda) fauna of South Africa

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Abstract.—Four new species of Cancellariidae are described from the continental shelf and upper continental slope off eastern South Africa. *Admetula afra* is distinguished from all congeners by its combination of small adult size (<11 mm), rounded shoulder, evenly reticulate sculpture, and distinct varix at the juncture of protoconch and teleoconch. *Trigonostoma kilburni* differs from all other *Trigonostoma* in its distinctive shell outline, unornamented peripheral keel, rounded rather than tabulate shoulder, and very narrow umbilicus. *Nipponaphera wallacei* differs from *N. paucicostata* (Sowerby, 1894), its geographically closest congener from the Arabian Sea area, in being umbilicate and in having a more rounded shoulder, and more numerous and finer spiral cords. Its frequent association with the turbinid *Bolma andersoni* suggests that it may be an ectoparasite of this species. *Zeadmete verheckeni* is most similar to *Zeadmete subantarctica* Powell, 1933, from off New Zealand, from which it can be distinguished by its lower spire and weaker surface sculpture. Among the South African taxa, *Z. verheckeni* most closely resembles “*Cancellaria*” *eutrios* Barnard, 1959, from which it is easily distinguished by its tabulate shoulder and lower spire. The geographic and bathymetric ranges of *Admetula epula* Petit & Harasewych, 1991, a species previously known only from “ex pisces” material, have been expanded based on live-collected specimens.

The Cancellariidae comprises a family of diverse and highly specialized, suctorial neogastropods that inhabit soft bottom, subtidal to bathyal habitats throughout tropical and temperate seas. The cancellariid fauna of South Africa was reviewed comprehensively by Barnard (1959) and Kensley (1973), and to a limited extent more recently in popular works by Richards (1981) and Steyn & Lussi (1998).

This paper describes four new species of cancellariids collected in South African waters by SCUBA and by the vessels R/V *Meiring Naudé* (1984–1988) and NMPD *Africana* (1995). These species are assigned to the genera *Admetula*, *Trigonostoma*, *Nipponaphera*, and *Zeadmete*. The new taxa are compared to related species from the Indian Ocean, New Zealand, and Australia.

All type specimens are housed in the collections of the Natal Museum (NM), Pietermaritzburg, Republic of South Africa.

Family Cancellariidae Forbes & Hanley,
1851

Genus *Admetula* Cossmann, 1889

Type species: Cancellaria evulsa (Solander, 1766) (= *Buccinum evulsum* Solander, 1766) by original designation.

Admetula epula Petit & Harasewych, 1991
Figs. 1–2, 18

Admetula epula Petit & Harasewych,
1991:181, figs. 1–3.

Diagnosis.—A small species with an ovately conical shell. Transition from pro-

toconch to teleoconch gradual, indicated by appearance first of spiral, then axial sculpture. Teleoconch sculpture of strong spiral cords and less pronounced, rounded axial ribs. Outer lip thin, smooth within.

Gross anatomy.—Preserved animal yellowish tan, foot long, narrow, tapering posteriorly. Mantle cavity spanning 0.67 whorl. Osphradium slightly broader than ctenidium. Pericardium very small. Tentacles symmetrical, bluntly cylindrical, flanking central rostrum. Eyes small, black. Proboscis short, about 0.67 length of mantle cavity. Buccal mass large, nearly filling retracted proboscis. Salivary glands and accessory salivary glands in cephalic haemocoel, not contained within proboscis. Penis long, narrow, dorsoventrally compressed, distal end bluntly rounded.

Remarks.—This species was originally described based on seven specimens taken from the stomachs of fish. Its bathymetric range was inferred to overlap with that of *Congiopodus spinifer* (Smith) (55–146 m), one of the fish from which it was taken. Among the material collected by the NMPD *Africana* [sta. A17419D] was a live collected specimen of *A. epula* (Figs. 1–2, 18) trawled at a depth of 210 m off the mouth of the Tsitsikamma River.

We have examined a specimen of *Admetula* from deeper water (450–500 m) off the Mbashe River, Transkei (R/V *Meiring Naudé* sta. Q14), between the type localities of *A. epula* and the new species. This specimen (NM C9050) is too worn for the transition from protoconch to teleoconch to be clearly discerned, but there is no indication of a pronounced varix. Because it also has secondary spiral cords between all primary cords, this specimen is tentatively identified as *A. epula*. This record expands the geographic range of *A. epula* from Cape St. Blaize to Transkei, off of the mouth of the Mbashe River (32°22.8'S, 29°00.8'E). The bathymetric range is extended well into the bathyal zone (450 m).

Admetula afra, new species

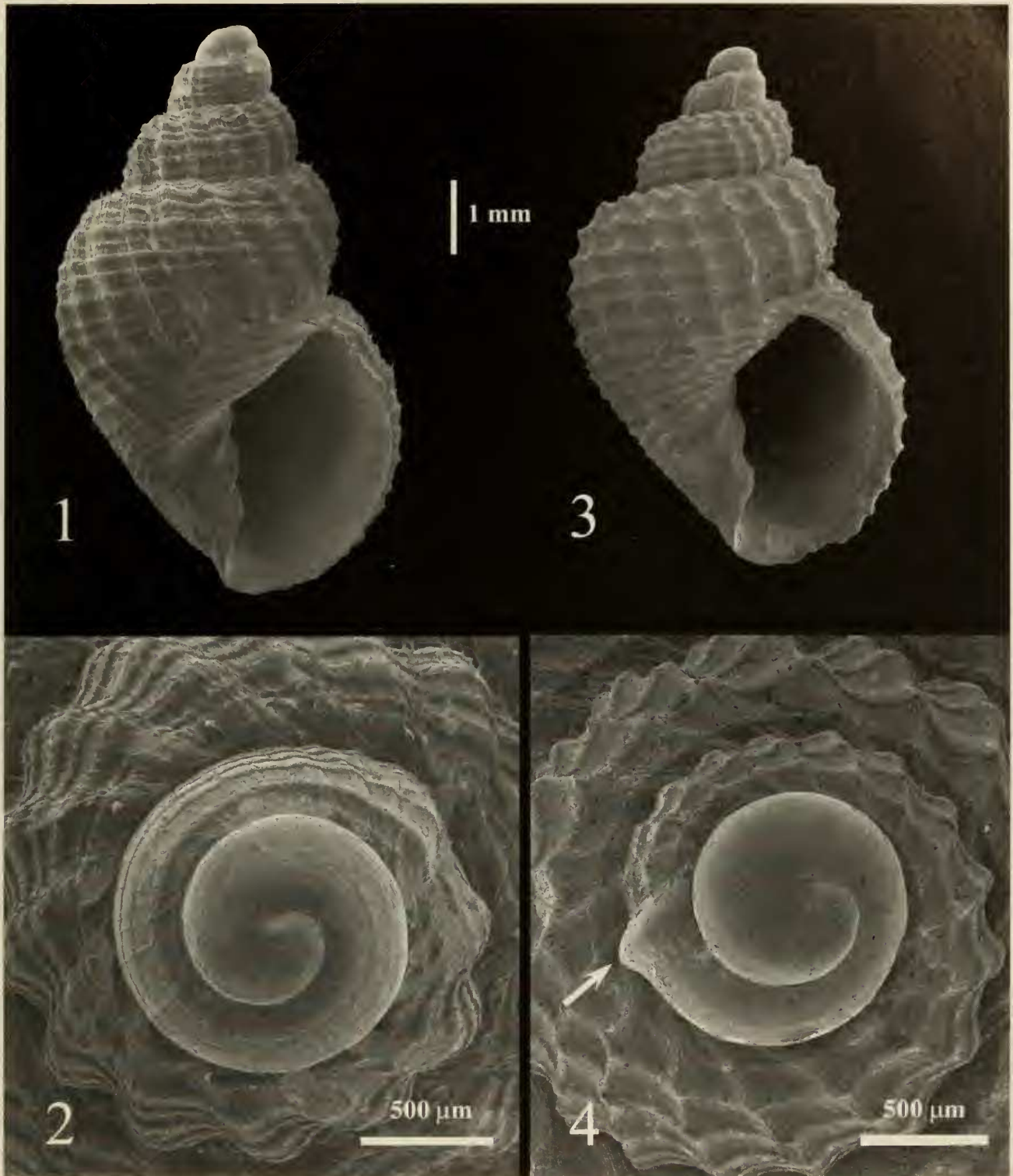
Figs. 3–4, 18

Diagnosis.—A small species with a broadly conical shell. Protoconch demarcated from teleoconch by broad, rounded varix. Teleoconch with sharply reticulated sculpture. Outer lip reflected posteriorly, with weak lirae beneath spiral cords.

Description.—Shell (Fig. 3) small, reaching 9.0 mm, ovately conical with rounded anterior. Protoconch (Fig. 4) of 1.67 smooth, inflated whorls deflected from coiling axis of teleoconch by about 7°. Transition to teleoconch (Fig. 4, arrow) demarcated by prominently rounded varix, followed immediately by onset of both spiral and axial sculpture. Teleoconch of 2.75–3 evenly rounded whorls. Suture weakly impressed. Shoulder rounded, weakly defined. Axial sculpture consists of narrow, regularly spaced, weakly prosocline ribs (14–16 on body whorl). Spiral sculpture of narrow, sharply defined primary cords (12–13 on body whorl, 6 on penultimate whorl). Single, weak, secondary cords may be present between primary cords on posterior half of body whorl. Spiral and axial sculpture intersect to form sharply reticulated pattern with small nodes at intersections of ribs and cords. Aperture broadly ovate, deflected from coiling axis by 16–19°. Outer lip thin, slightly flared posteriorly, weakly lirate beneath spiral cords. Parietal callus thin, translucent, overlying 5–6 spiral cords from previous whorl. Columella forming angle of 128–130° with parietal region, thick, straight, with two weak columellar folds and broad siphonal fold. Siphonal canal shallow but well-defined. Shell color white.

Type locality.—SE of Port Durnford, South Africa (29°01.5'S, 32°11.8'E), dredged in 310–320 m, glutinous sandy mud. R/V *Meiring Naudé* sta. ZQ9, 6 Jul 1985.

Type material.—Holotype, NM E3189/T1382, 8.0 mm; Paratype 1, 7.8 mm, and Paratype 2, 6.9 mm, NM V7006/T1383 from the type locality; Paratype 3, 9.0 mm, NM E3764, from off Cape Vidal (28°08.4'S,



Figs. 1–4. 1–2; *Admetula epula* Petit & Harasewych, 1991. Off Tsitsikamma River, South Africa (34°45'S, 24°47'E) in 210 m, sand, old shell grit and shell debris. NMPD *Africana* sta. A17419D. 1. Apertural view of shell. 2. Apical view of protoconch. 3–4. *Admetula afra* new species. Holotype, NM E3189/T1382, SE of Port Durnford, South Africa (29°01.5'S, 32°11.8'E), dredged in 310–320 m, glutinous sandy mud. R/V *Meiring Naudé* sta. ZQ9, 6 Jul 1985. 3. Apertural view of holotype. 4. Apical view of protoconch.

32°36.4'E), dredged in 165 m, moderately fine sand, R/V *Meiring Naudé* sta. ZM8, 11 June 1988.

Etymology.—Feminine form of the Latin *afra*, African.

Comparative remarks.—This new species appears most closely related to the more southern *Admetula epula* Petit & Harasewych, 1991, from which it differs in having uniformly rectangular sculpture

formed by equally-sized axial ribs and spiral cords, and a posteriorly reflected outer lip with weak denticles beneath the spiral cords. The most striking difference between these two species is the presence of a strong varix at the termination of the protoconch in *A. afra*. In contrast, the transition from protoconch to teleoconch is indistinct and gradual in *Admetula epula*.

Genus *Trigonostoma* Blainville, 1827

Type species: Delphinula trigonostoma Lamarck, 1822 (?=*Buccinum scalare* Gmelin, 1791) by monotypy.

Trigonostoma kilburni, new species
Figs. 5–10, 18

Diagnosis.—A small species with a thin, angular, narrowly umbilicate shell. Shoulder rounded, not tabulate, lacking pronounced spines. Axial sculpture of numerous scabrous varices. Outer lip smooth, lacking lirae.

Description.—Shell (Fig. 5) small, reaching 14.3 mm, thin, angular, biconical, strongly shouldered, with deep, narrow umbilicus. Spire high (spire angle 55°), comprising over half of shell length. Protoconch (Figs. 6–7) of 2 smooth whorls, offset from coiling axis of shell by about 5° . Transition to teleoconch abrupt, marked by a slightly flared varix and the onset of spiral sculpture. Teleoconch of up to 5 sharply angular whorls. Suture deeply impressed behind the evenly rounded shoulder delineated by a sharp keel along the periphery of the shell. Axial sculpture consists of numerous, flared, weakly prosocline varices (Fig. 8), regularly spaced on early whorls (about 16–18 on first teleoconch whorl), increasing in number and becoming more irregularly spaced in subsequent whorls. Spiral sculpture of broad, crisply demarcated primary spiral cords (Fig. 8, p), with 1–3 slightly narrower secondary cords (Fig. 8, s) between adjacent primary cords, and much finer spiral threads (Fig. 8, t) between some cords. Aperture roundly triangular, deflect-

ed from coiling axis by $18\text{--}19^\circ$. Siphonal canal short, broad, barely discernible except externally as the siphonal fasciole. Outer lip thin, smooth within, slightly reflected with spiral cords visible through edge of lip. Posterior portion of inner lip adpressed against siphonal fasciole. Short parietal region forms angle of 150° with long, slightly concave columella that bears 2 weak, widely spaced columellar folds and 1 siphonal fold. Umbilicus deep, narrow. Shell white, sometimes with a yellowish cast.

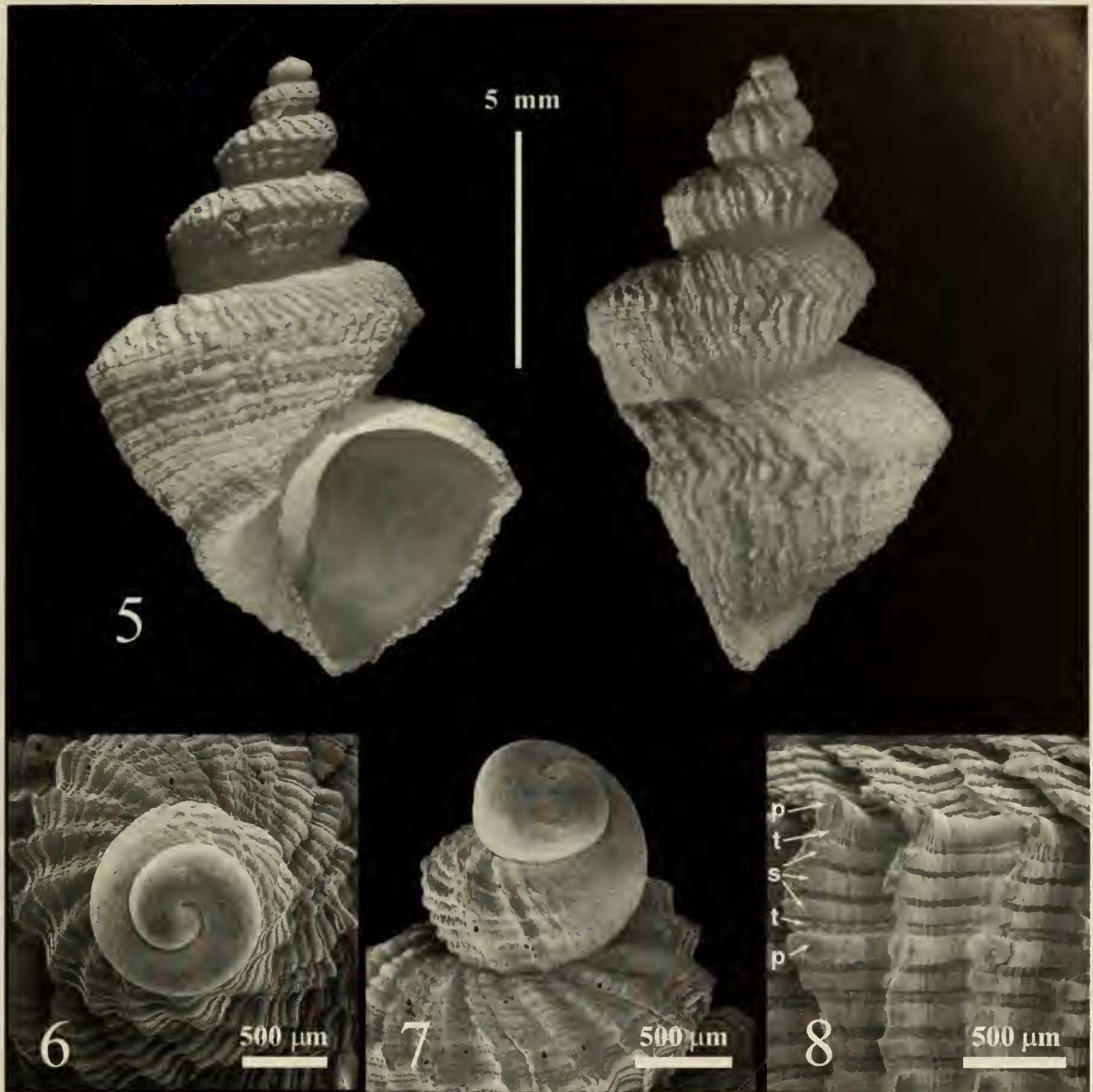
Radular teeth (Figs. 9–10) extremely long, ribbon-like, tricuspid. Central cusp smooth, with recurved rim. Lateral cusps long, folded toward central cusp, each with four, anteriorly directed secondary cusps. Second most proximal secondary cusp bifid.

Type locality.—Off East London, South Africa ($33^\circ04.7'S$, $28^\circ07.2'E$) dredged in 90 m, associated with coarse sand, sponges, gorgonians. R/V *Meiring Naudé* sta. XX46, 17 Jul 1984.

Type material.—Holotype, NM D679, 12.9 mm, from type locality. Paratype, NM D680, 14.4 mm, off Kidd's Beach, South Africa ($33^\circ11.8'S$, $28^\circ03.2'E$) dredged in 90 m, associated with coarse sand, sponges. R/V *Meiring Naudé* sta. XX50, 17 Jul 1984.

Etymology.—This species honors Dr. Richard N. Kilburn, Natal Museum, Pietermaritzburg, Republic of South Africa, for his many contributions to malacology.

Comparative remarks.—This new species differs from all other *Trigonostoma* in its distinctive shell outline. It may be distinguished from *Trigonostoma scalare* (Gmelin, 1791) and *T. thysthlon* (Petit & Harasewych, 1987) by its unornamented peripheral keel, its rounded rather than tabulate shoulder, and by its very narrow umbilicus. The only other South African *Trigonostoma* is the common shallow-water *T. semidisjuncta* (Sowerby, 1849), which has a heavier, more rounded shell with strong spiral cords.



Figs. 5–8. *Trigonostoma kilburni* new species. Holotype, NM D679, Off east London, South Africa (33°04.7'S, 28°07.2'E), dredged in 90 m, coarse sand, sponges, gorgonians. R/V *Meiring Naudé* sta. XX46, 17 Jul 1984. 5. Apertural and lateral views of holotype. 6. Apical and 7. Lateral views of protoconch. 8. Detail of surface sculpture on body whorl. p, primary spiral cords; s, secondary spiral cords; t, spiral threads.

Genus *Nipponaphera* Habe, 1961

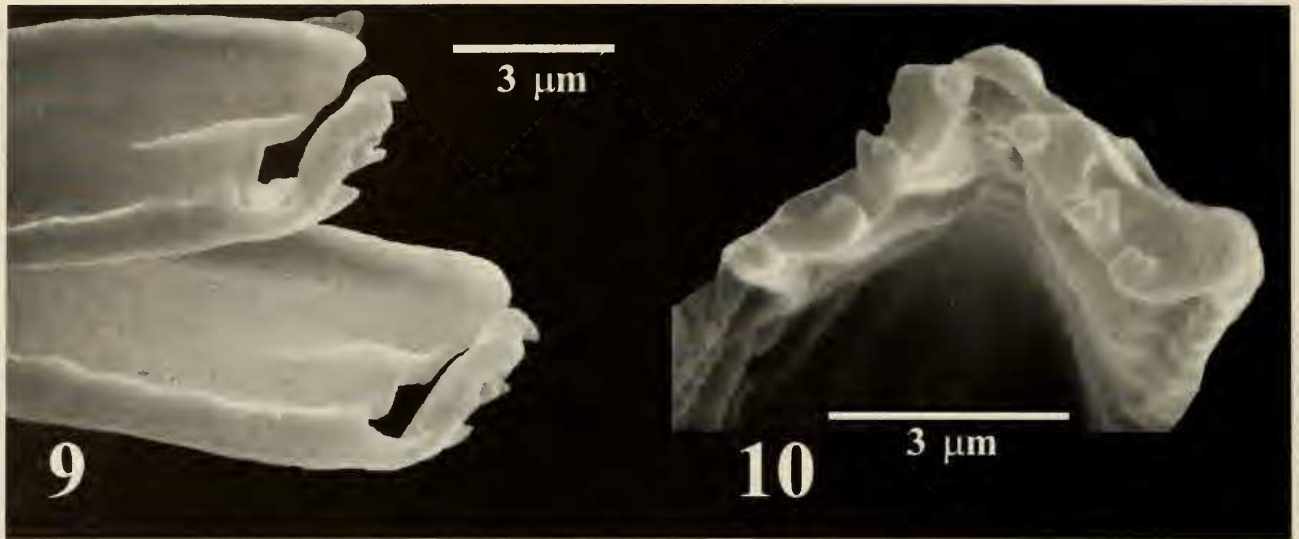
Type species: Nipponaphera habei Petit, 1972 by I.C.Z.N. Opinion 1052.

Nipponaphera wallacei new species
Figs. 11–13, 16

Diagnosis.—A small species with a heavy, strongly sculptured, narrowly umbilicate shell. Aperture sharply triangular, outer lip with strong teeth along inner edge

of varix. Columella with two prominent, sharply keeled columellar folds and a strongly reflected siphonal fold.

Description.—Shell (Fig. 11) small for genus, to 12.4 mm, ovately conical, with rounded anterior. Spire relatively short (spire angle 70°), comprising less than half of shell length. Protoconch (Fig. 13) of 1.67 smooth, inflated whorls. Transition to teleoconch marked by onset of spiral cords followed immediately by strong axial ribs. Te-



Figs. 9–10. *Trigonostoma kilburni* new species. Distal ends of radular teeth of holotype. 9. Lateral view. 10. End-on view.

leoconch of up to 4 angular whorls. Suture impressed behind sloping shoulder that is delineated by peripheral keel. Axial sculpture of strong, broad, prosocline ribs (10 on penultimate whorl) that become more widely spaced on body whorl where they appear as varices with flared edges. Spiral sculpture of broad, flattish primary cords, 3 secondary cords between adjacent primary cords, with fine threads between some cords. Aperture sharply triangular, deflected from coiling axis by 20° . Siphonal canal short, well-defined. Outer lip reflected anteriorly, with spiral sculpture visible through thin edge, 9 strong teeth along inner edge of varix, small, angular indentation at shoulder. Parietal region short, columella straight, with small, thin callus, 2 sharply keeled columellar folds and strongly reflected siphonal fold. Umbilicus narrow, inconspicuous, bordered by well-developed, cord-like siphonal fasciole. Shell color chestnut brown, with lighter spiral bands along shoulder and middle of body whorl.

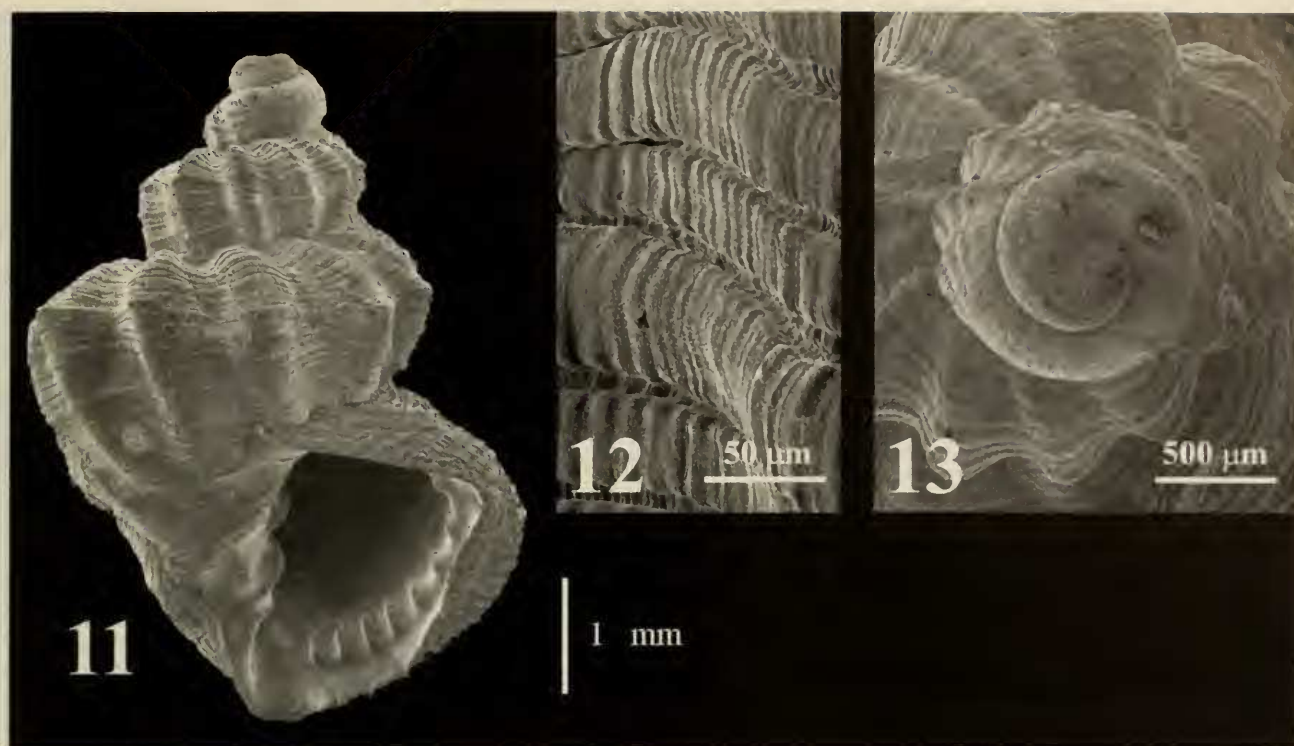
Type locality.—Off Phumula, Natal, South Africa, in 45 m, on reef. Jun 1997.

Type material.—Holotype, NM V4689, 6.6 mm, from type locality. Paratype 1, NM V3889, Off Phumula, Natal, South Africa, in 35 m, taken by SCUBA, living on shell of *Bolma andersoni* (E. A. Smith, 1902). 4

Sep 1996. Paratype 2, NM V303, 12.4 mm, Off Park Rynie, Natal, South Africa, in 53 m. Taken by SCUBA, living on the spire of the turbinid gastropod *Bolma andersoni*. 19 May 1990.

Etymology.—This species is named for Mr. Martin Wallace, who collected the type material and generously made it available for study.

Comparative remarks.—The genus *Nipponaphera* is distinguished from *Trigonostoma* primarily by the presence, in the latter, of an open umbilicus that extends back to the protoconch. Also, *Nipponaphera* has a wide and flat siphonal fold. Although the new species here described has an umbilicus, it is not profound. It differs from *N. paucicostata* (Sowerby, 1894) of the Arabian Sea area in being umbilicate, in having a more rounded shoulder, and more and finer spiral cords. Specimens of *N. paucicostata* figured by Verhecken (1986, Figs. 4–6) lack varix-like axial ribs on the body whorl, but the type specimen has very strong, unevenly spaced ribs on the body whorl. The Japanese *N. teramachii* (Habe, 1961) has a sharp keel, is umbilicate, with a cord-like siphonal fasciole, but lacks the squarish, finely imbricated spiral sculpture of this new species. Melvill and Standen (1901:451) reported *N. paucicostata* from the Gulf of Aden “adhering to the upper



Figs. 11–13. *Nipponaphera wallacei* new species. Holotype, NM V4689, Off Phumula, Natal, South Africa, SCUBA in 45 m, on reef. Jun 1997. 11. Apertural view of holotype. 12. Detail of sculpture on body whorl. 13. Apical view of protoconch.

part of *Rapana bulbosa*, 30–50 fathoms.” The alimentary system of cancellariids is adapted to feed on body fluids of prey/host organisms (Petit & Harasewych, 1986; Harasewych & Petit, 1986). The association of species of *Nipponaphera* with other gastropods suggests that this group of cancellariids may be specialized ectoparasites of large gastropods.

Genus *Zeadmete* Finlay, 1926

Type species: Cancellaria trailli Hutton, 1973 by original designation.

Zeadmete verheckeni, new species

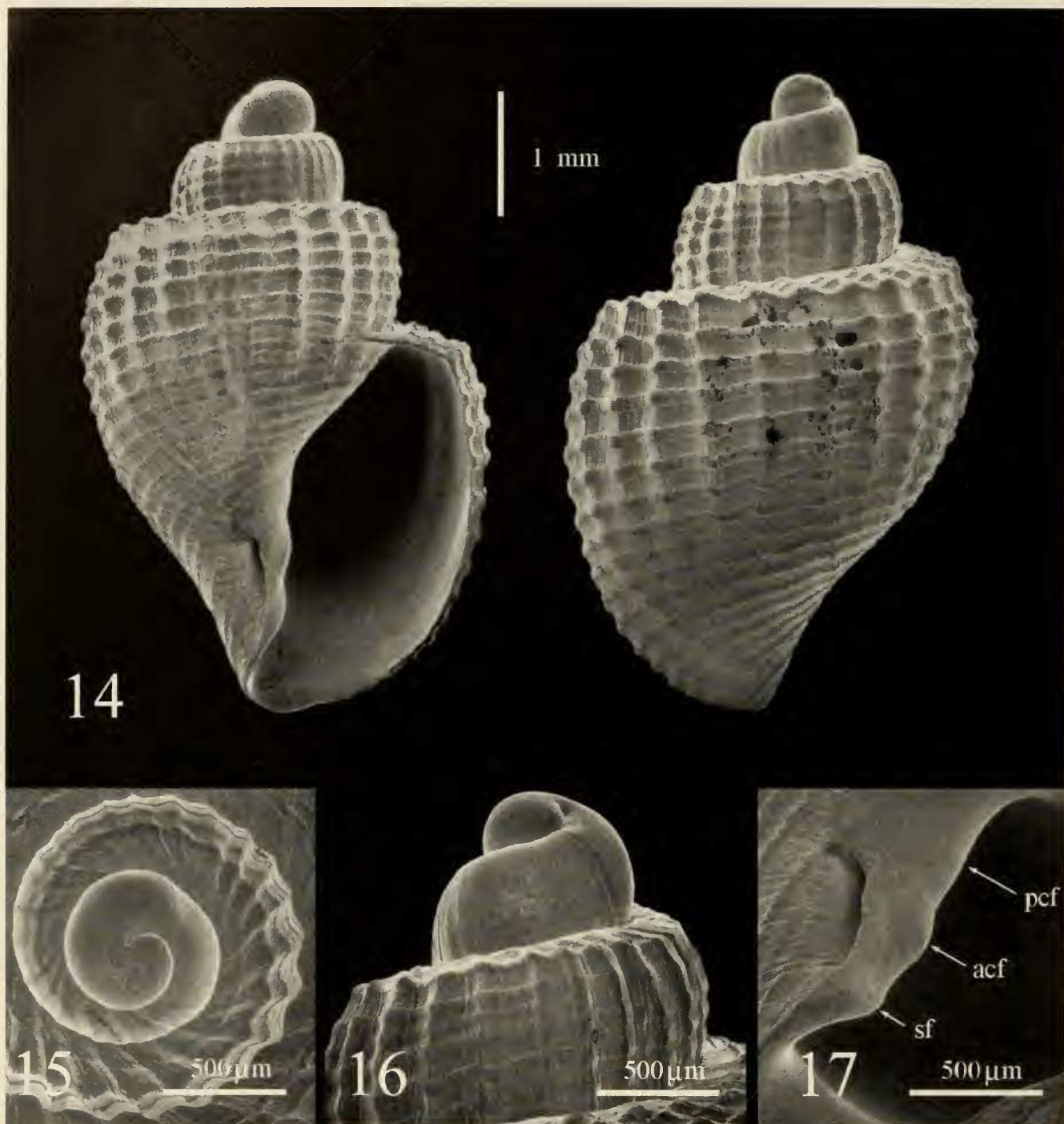
Figs. 14–18

Diagnosis.—A small species with an ovate shell. Shoulder tabulate. Surface sculpture dominated by spiral cords. Pseudo-umbilicus narrow. Outer lip thin, smooth within. Buccal mass minute. Radula absent.

Description.—Shell (Fig. 14) small, reaching 7.9 mm, thin, with stepped spire, rounded anterior. Protoconch (Figs. 15–16) erect, smooth, of 1.5 whorls. Transition to

teleoconch abrupt, marked by onset of weak, closely-spaced axial ribs that become stronger, more regularly spaced, when spiral cords first appear within 0.25 whorl. Teleoconch of 2 rounded, strongly tabulate whorls. Suture strongly impressed. Axial sculpture of evenly spaced, well-defined, axially aligned ribs (30 on body whorl) as broad as intervening spaces. Spiral sculpture of sharply demarcated evenly spaced cords (2 between suture and shoulder, 17 below shoulder) diminishing in strength abapically, forming small nodules as they cross axial ribs. Aperture elongated, narrowly elliptical. Outer lip faintly sinuate, smooth within. Columella with two broad, weak, columellar folds (Fig. 17, pcf, acf) and siphonal fold (Fig. 17, sf). Siphonal canal small but distinct, axially aligned, not forming siphonal fasciole. Anterior portion of inductura bordered by weak parietal wash, partially covering narrow pseudo-umbilicus. Shell color white. Periostracum thin, finely lamellate, straw-colored.

Preserved animal white, with short, narrow, posteriorly rounded foot. Tentacles tu-



Figs. 14–17. *Zeadmete verheckeni* new species. Holotype, NM C6800, Off Stony Point, Transkei, South Africa (32°37.5'S, 28°45.8'E), dredged in 390–400 m, muddy sand, small stones. R/V *Meiring Naudé* sta. V11, 12 Jul 1984. 14. Apertural and dorsal views of holotype. 15. Apical and 16. Lateral views of protoconch. 17. Columella. pcf, posterior columellar fold; acf, anterior columellar fold; sf, siphonal fold.

bular, symmetrical, with very large black eyes at their bases. Penis long, narrow, dorso-ventrally flattened, with small terminal papilla. Osphradium very broad, strongly asymmetrical, dorsal leaflets twice as broad as ventral leaflets. Ctenidium less than half as wide and twice as long as osphradium. Hypobranchial gland large, glandular. Retracted proboscis occupies anterior two-

thirds of cephalic haemocoel, the rest occupied by long, convoluted mid-esophagus. Proboscis strongly coiled within proboscis sheath. Extended proboscis likely exceeds shell length. Proboscis thin, with minute buccal mass in anteriormost 0.125 of proboscis. Radula absent.

Type locality.—Off Stony Point, Transkei, South Africa (32°37.5'S, 28°45.8'E),

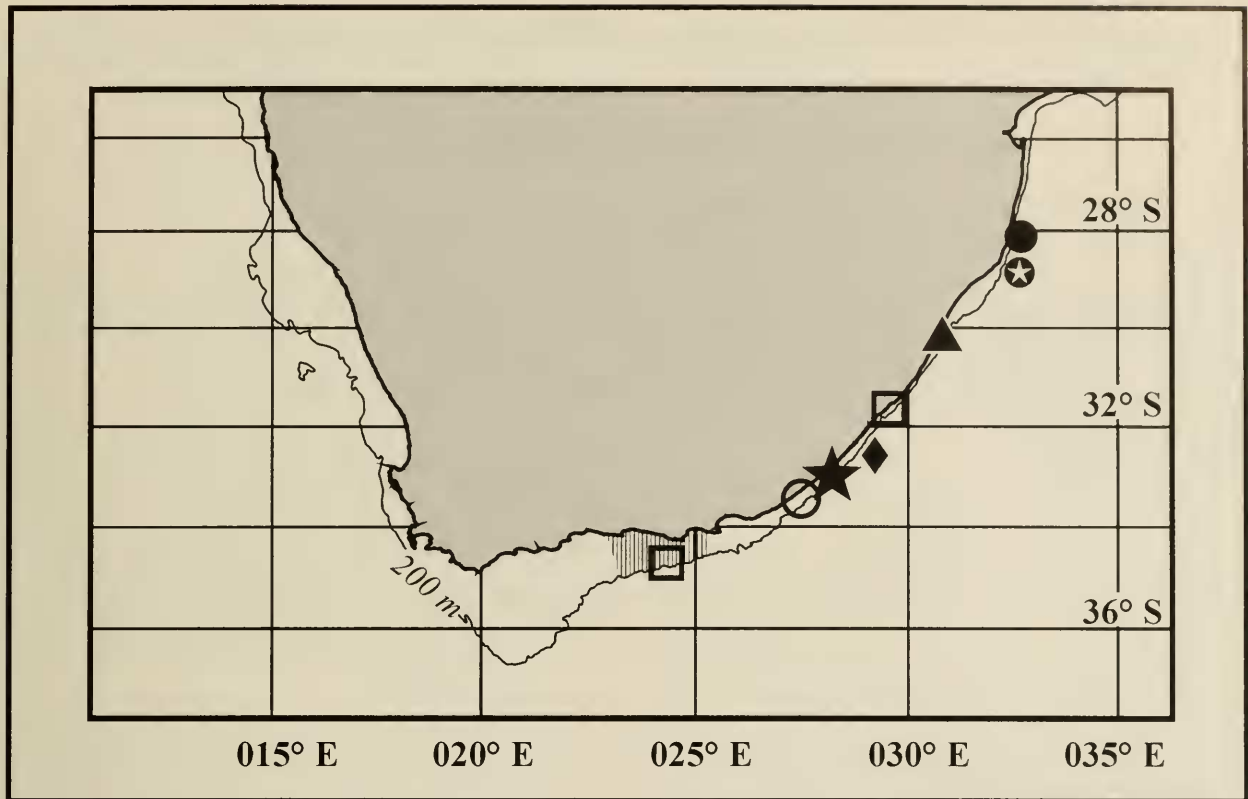


Fig. 18. Geographic distributions of South African Cancellariidae. *Admetula epula* Petit & Harasewych, 1991, vertically hatched area = type locality; open squares = new records. *Admetula afra* new species, star in circle = type locality; filled circle = additional record. *Trigonostoma kilburni* new species, black star = type locality; open circle = additional record. *Nipponaphera wallacei* new species, triangle = type locality. *Zeadmete verheckeni* new species, diamond = type locality.

dredged in 390–400 m, muddy sand, small stones. R/V *Meiring Naudé* sta. V11, 12 Jul 1984.

Type material.—Holotype, NM C6800, 5.1 mm, from type locality.

Etymology.—Named for Mr. André Verhecken, Mortsels, Belgium, in recognition of his contributions to the study of the Cancellariidae.

Comparative remarks.—Placement of this new species in the genus *Zeadmete* is tentative. *Zeadmete verheckeni* is conchologically most similar to a group of species from off the southern coasts of New Zealand and Australia that have been assigned to the genera *Oamaruia* Finlay, 1924 and *Zeadmete* Finlay, 1926. Powell (1979:224) treated *Zeadmete* as a subgenus of *Oamaruia*. Several New Zealand and Australian species presently assigned to *Zeadmete* agree with this South African species in shell form and sculpture (see Garrard 1975, Powell 1979). *Zeadmete subantarctica*

Powell, 1933, from 50 fathoms off Snares Islands, New Zealand, has the same shell shape and columellar structure as *Z. verheckeni* but has deeply cancellated sculpture on the posterior half of the body whorl and only spiral cords on the anterior portion.

In the course of a study on Australian cancellariids, we found that the abyssal *Zeadmete kulanda* Garrard, 1975 has a radula similar to that of *Nothoadmete tumida* (Oliver, 1982:figs. 3, 5). The fact that no radula was found in *Z. verheckeni* argues against these species being congeneric. However, we are reluctant to introduce another genus-level taxon until more data on the species with this shell form are available. The problems of generic placement of small, deep-water cancellariids was briefly discussed by Verhecken (1997:296).

Among the South African taxa, this species most closely resembles "*Cancellaria*" *eutrius* Barnard, 1959, from which it is

easily distinguished by its tabulate shoulder and lower spire.

Acknowledgments

We thank Dr. Richard N. Kilburn for making these specimens available and for his patience in waiting for their description. Correspondence and discussion with Mr. André Verhecken of Mortsels, Belgium added to our knowledge and was helpful in preparing this paper.

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